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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/572,511	03/17/2006	Masanori Masuda	DK-US065033	3327
22919 7590 09/29/2008 GLOBAL IP COUNSELORS, LLP 1233 20TH STREET, NW, SUITE 700 WASHINGTON, DC 20036-2680				
EXAMINER				
JACOBS, TODD D				
ART UNIT		PAPER NUMBER		
4159				
MAIL DATE		DELIVERY MODE		
09/29/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/572,511

**Applicant(s)**

MASUDA, MASANORI

**Examiner**

TODD D. JACOBS

**Art Unit**

4159

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)
- Paper No(s)/Mail Date See Continuation Sheet
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :17 March 2006 and 06 February 2008.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by publication JP 60-92789A of Mitsubishi, relying on a partial translation and figures provided by applicant and included.

3. In re claim 1, with reference to figure 1 below, Mitsubishi discloses a rotary compressor comprising:

- a rotation mechanism (RM) including a cylinder (2) having an annular cylinder chamber (CH);
- an annular piston (3c) disposed in the cylinder chamber to be eccentric to the cylinder, the annular piston dividing the cylinder chamber into an outer compression chamber (23) and an inner compression chamber (20, 21); and
- a blade (7) disposed in the cylinder chamber (CH) to divide each of the inner and outer compression chambers (20, 21, 23) into a high-pressure side (20, 21) and a low-pressure side (23), the rotation mechanism compressing a fluid by relatively rotating the cylinder and the piston,
- one of the inner and outer compression chambers being a low-stage side compression chamber for compressing a low-pressure fluid into an intermediate-pressure fluid, and the other of the inner and outer compression chambers being a high-

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stage side compression chamber for compressing the intermediate-pressure fluid compressed in the low-stage side compression chamber into a high-pressure fluid.

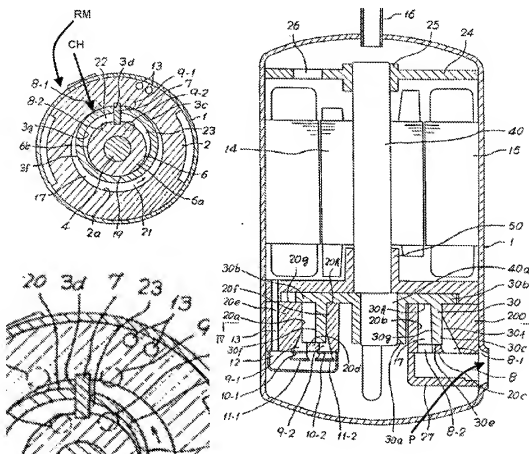


Figure 1

4. In re claim 2, with reference to figure 1 above, Mitsubishi discloses the rotary compressor wherein the outer compression chamber (23) serves as the low-stage side compression chamber, and the inner compression chamber (20, 21) serves as the high-stage side compression chamber.
5. In re claim 5, Mitsubishi discloses the rotary compressor further comprising:
  - a casing (1) containing the rotation mechanism (RM), the casing forming an intermediate-pressure space (8) into which the intermediate-pressure fluid compressed

in the low-stage side compression chamber is introduced and a high-pressure space into which a high-pressure fluid is introduced (12), the intermediate-pressure space being obtained by compressing, in the low-stage side compression chamber, the intermediate-pressure fluid contained in the intermediate-pressure space and discharged from the high-stage side compression chamber.

6. In re claim 7, Mitsubishi discloses the rotary compressor further comprising a driving mechanism for driving the rotation mechanism, the driving mechanism including:

- a stator (15)
- a rotor (3) and
- a drive shaft coupled to the rotor (4),
- the drive shaft including an eccentric part that is eccentric from a center of rotation (4a),
- the eccentric part being coupled to the rotor (3), and
- a part of the drive shaft located at both axial sides of the eccentric part being supported via bearing parts in the casing.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsubishi in view of publication JP 2001-207983 to Seiichiro, relying on a translation provided by applicant and included.

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9. In re claim 3, with reference to figure 1 above, Mitsubishi discloses the rotary compressor comprising a casing containing the rotation mechanism (1), the casing forming an intermediate-pressure space (8) into which the intermediate-pressure fluid compressed in the low-stage side compression chamber is introduced; but fails to disclose a gas injection pipe connected to the casing and configured to accommodate a gas that is injected into the intermediate pressure space.

10. Nevertheless, Seiichiro states that "intermediate pressure CO<sub>2</sub> gas is replenished with CO<sub>2</sub> gas from an external refrigerant gas supply port 28 to make up for shortage of capacity by two state compression" in the English translated abstract, line 18.

11. Therefore, it would be obvious to one having ordinary skill in the art at the time of the invention to modify Mitsubishi in view of Seiichiro by adding an external gas injection pipe of Seiichiro to Mitsubishi in order to make up for shortage of capacity by two state compression.

12. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsubishi in view of Choi et al (2004/0161345).

13. In re claim 4, Mitsubishi discloses a driving mechanism for driving the rotation mechanism, but fails to disclose rotation speed of the driving mechanism being variably controlled.

14. Nevertheless, Choi discloses a "variable capacity rotary compressor" (title) which is a common type of controlled compressor.

15. Therefore, it would be obvious to modify Mitsubishi in view of Choi by using the variable capacity abilities of Choi with the rotary compressor of Mitsubishi in order to use a type of compressor well-known in the art.

16. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsubishi in further view of Ashikian (4,553,903).

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17. In re claim 6, while Mitsubishi discloses intermediate-pressure space formed next to the high-pressure space, Mitsubishi fails to disclose the intermediate-pressure space formed below the high-pressure space.

18. Nevertheless, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the intermediate-pressure space below the high-pressure space, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70. Please note that in the instant application, applicant has not disclosed any criticality for the claimed limitations.

19. Mitsubishi also fails to disclose the casing including an oil return passage through which the high-pressure space communicates with the intermediate-pressure space.

20. Nevertheless, as this is a well-known function in the art, Ashikian, for use in a multi-stage compressor, discloses that "the total volume of oil may be increased to the desired degree to assist in carrying away some of the heat produced since no provision is made for interstage cooling. A suitable oil return passage (not shown) is provided to return oil collecting inside rear pan 220 to the interior of compartment 160 for readmission into the first stage" (col 16, line 33).

21. Therefore, it would be obvious to one having ordinary skill in the art at the time of the invention to use the oil return passage of Ashikian in the rotary compressor of Mitsubishi in order to open communication between the high pressure space and the intermediate pressure space for aiding cooling.

22. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsubishi as applied to claim 1 above, in further view of Saitu et al (6,077,058).

23. In re claim 8, with reference to figure 1 above, Mitsubishi discloses the rotary compressor wherein:

- the piston (3c) is C-shaped to form a gap,



- the blade (7) extends from an inner peripheral wall surface of the cylinder chamber to an outer peripheral wall surface thereof and passes through the gap of the piston, and
24. However, while the surface is rounded, Mitsubishi fails to disclose the gap has a swing bushing contacting the piston and the blade therein such that the blade is reciprocable and the blade is swingable relative to the piston.
25. Nevertheless, Saitou (6,077,058) with respect to figure 2 below, discloses "the driving shaft in a cylinder room with supported by a swing bush (32) as a supporting point though a blade (31) (line 2, abstract). This feature allows the blade and the eccentric piece to rotate easier.
26. Therefore, it would be obvious to one having ordinary skill in the art at the time of the invention to modify Mitsubishi in view of Saitou by using the swing bush of Saitu in the compressor of Mitsubishi in order to aid the blade's and eccentric piece's movement.

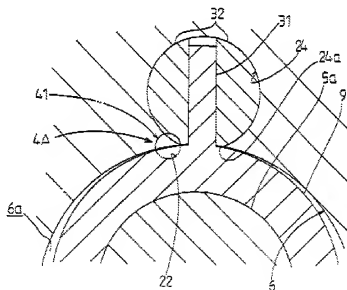


Figure 2

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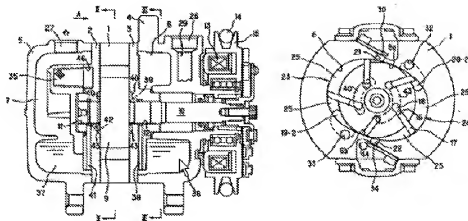
27. Claims 1-3, 5, 7, are rejected under 35 U.S.C. 103(a) as being unpatentable over Seiichiro in view of Mitsubishi.

28. In re claim 1, Seiichiro discloses with reference to figure 1 above and 3 below, a rotary compressor comprising [see figure 3]:

- a rotation mechanism including a cylinder (1) having an annular cylinder chamber (25);

29. However, Seiichiro fails to disclose:

- an annular piston disposed in the cylinder chamber to be eccentric to the cylinder, the annular piston dividing the cylinder chamber into an outer compression chamber and an inner compression chamber; and
- a blade disposed in the cylinder chamber to divide each of the inner and outer compression chambers into a high-pressure side and a low-pressure side, the rotation mechanism compressing a fluid by relatively rotating the cylinder and the piston,
- one of the inner and outer compression chambers being a low-stage side compression chamber for compressing a low-pressure fluid into an intermediate-pressure fluid, and the other of the inner and outer compression chambers being a high-stage side compression chamber for compressing the intermediate-pressure fluid compressed in the low-stage side compression chamber into a high-pressure fluid.



**Figure 3**

30. Nevertheless, with reference to figure 1 above, Mitsubishi discloses:

- an annular piston (3c) disposed in the cylinder chamber to be eccentric to the cylinder, the annular piston dividing the cylinder chamber into an outer compression chamber (23) and an inner compression chamber (20, 21); and
- a blade (7) disposed in the cylinder chamber (CH) to divide each of the inner and outer compression chambers (20, 21, 23) into a high-pressure side (20, 21) and a low-pressure side (23), the rotation mechanism compressing a fluid by relatively rotating the cylinder and the piston,
- one of the inner and outer compression chambers being a low-stage side compression chamber for compressing a low-pressure fluid into an intermediate-pressure fluid, and the other of the inner and outer compression chambers being a high-stage side compression chamber for compressing the intermediate-pressure fluid compressed in the low-stage side compression chamber into a high-pressure fluid.

31. This construction is a design alternative in structure that would allow for less leakage between the high and low pressure chambers, because they are more separated than the tangent surfaces of Seiichiro.

32. Therefore, it would be obvious to one having ordinary skill in the art at the time of the invention to modify Seiichiro in view of Mitsubishi by using the concentric chambers of Mitsubishi on the multi-chamber rotary compressor of Seiichiro in order to have less leakage between the high and low pressure chambers, because they are more separated than the tangent surfaces of Seiichiro.

33. In re claim 2, with reference to figure 3 above, Seiichiro/Mitsubishi fails to disclose which chamber yields the high and intermediate pressure. The rotary compressor wherein the outer compression chamber (23) serves as the low-stage side compression chamber, and the inner compression chamber (20, 21) serves as the high-stage side compression chamber.

34. It would have been obvious to one having ordinary skill in the art at the time the invention was made to let the outer compression chamber serve as the low-stage side compression chamber, and the inner compression chamber serve as the high-stage side compression chamber since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Please note that in the instant application, applicant has not disclosed any criticality for the claimed limitations.

35. In re claim 3, with reference to figure 1 above, Seiichiro/Mitsubishi discloses the rotary compressor comprising a casing containing the rotation mechanism (1), the casing forming an intermediate-pressure space (8) into which the intermediate-pressure fluid compressed in the low-stage side compression chamber is introduced; but fails to disclose a gas injection pipe connected to the casing and configured to accommodate a gas that is injected into the intermediate pressure space. Note that Seiichiro states that an "intermediate pressure CO<sub>2</sub> gas is replenished with CO<sub>2</sub> gas from an external refrigerant gas supply port 28 to make up for shortage of capacity by two state compression" in the English translated abstract, line 18.

36. In re claim 5, Seiichiro/Mitsubishi discloses the rotary compressor further comprising:
- a casing (C) containing the rotation mechanism, the casing forming an intermediate-pressure space (8) into which the intermediate-pressure fluid compressed in the low-stage side compression chamber is introduced and a high-pressure space into which a high-pressure fluid is introduced (7), the intermediate-pressure space being obtained by compressing, in the low-stage side compression chamber, the intermediate-pressure fluid contained in the intermediate-pressure space and discharged from the high-stage side compression chamber.
37. In re claim 7, Mitsubishi discloses the rotary compressor further comprising a driving mechanism for driving the rotation mechanism, the driving mechanism including [see figure 1]:
- a stator (15)
  - a rotor (3) and
  - a drive shaft coupled to the rotor (4),
  - the drive shaft including an eccentric part that is eccentric from a center of rotation (4a),
  - the eccentric part being coupled to the rotor (3), and
  - a part of the drive shaft located at both axial sides of the eccentric part being supported via bearing parts in the casing.
38. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seiichiro/Mitsubishi as applied to claim 1 above, in further view of Choi et al (2004/0161345).
39. In re claim 4, Seiichiro/Mitsubishi discloses a driving mechanism for driving the rotation mechanism, but fails to disclose that rotation speed of the driving mechanism being variably controlled.

40. Nevertheless, Choi discloses a "variable capacity rotary compressor" (title) which is a common type of controlled compressor.

41. Therefore, it would be obvious to modify Seiichiro/Mitsubishi in view of Choi by using the variable capacity abilities of Choi with the rotary compressor of Mitsubishi in order to use a type of compressor well-known in the art.

42. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seiichiro/Mitsubishi as applied to claim 1 above, in further view of Ashikian (4,553,903).

43. In re claim 6, while Seiichiro/Mitsubishi discloses intermediate-pressure space formed above to the high-pressure space, Seiichiro/Mitsubishi fails to disclose the intermediate-pressure space formed below the high-pressure space.

44. Nevertheless, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the intermediate-pressure space below the high-pressure space, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70. Please note that in the instant application, applicant has not disclosed any criticality for the claimed limitations.

45. Seiichiro/Mitsubishi also fails to disclose the casing including an oil return passage through which the high-pressure space communicates with the intermediate-pressure space.

46. Nevertheless, as this is a well-known function in the art, Ashikian, for use in a multi-stage compressor, discloses that "the total volume of oil may be increased to the desired degree to assist in carrying away some of the heat produced since no provision is made for interstage cooling. A suitable oil return passage (not shown) is provided to return oil collecting inside rear pan 220 to the interior of compartment 160 for readmission into the first stage" (col 16, line 33).

47. Therefore, it would be obvious to one having ordinary skill in the art at the time of the invention to use the oil return passage of Ashikian in the rotary compressor of

Seiichiro/Mitsubishi in order to open communication between the high pressure space and the intermediate pressure space for aiding cooling.

48. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seiichiro/Mitsubishi as applied to claim 1 above, in further view of Saitu et al (6,077,058).

49. In re claim 8, with reference to figure 1 above, Mitsubishi discloses the rotary compressor wherein:

- the piston (3c) is C-shaped to form a gap,
- the blade (7) extends from an inner peripheral wall surface of the cylinder chamber to an outer peripheral wall surface thereof and passes through the gap of the piston, and

50. However, while the surface is rounded, Mitsubishi fails to disclose the gap has a swing bushing contacting the piston and the blade therein such that the blade is reciprocable and the blade is swingable relative to the piston.

51. Nevertheless, Saitou (6,077,058) with respect to figure 2 above discloses "the driving shaft in a cylinder room with supported by a swing bush (32) as a supporting point though a blade (31) (line 2, abstract). This feature allows the blade and the eccentric piece to rotate easier.

52. Therefore, it would be obvious to one having ordinary skill in the art at the time of the invention to modify Mitsubishi in view of Saitou by using the swing bush of Saitu in the compressor of Mitsubishi in order to aid the blade's and eccentric piece's movement.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TODD D. JACOBS whose telephone number is (571)270-5708. The examiner can normally be reached on Monday - Friday, 7:30-5:00; Alt. Fridays only.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, George Nguyen can be reached on 571-272-4491. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TODD D. JACOBS/  
Examiner, Art Unit 4159

/Quang T Van/  
Primary Examiner, Art Unit 3742  
September 25, 2008